TEACHING

A QUARTERLY TECHNICAL JOURNAL FOR TEACHERS

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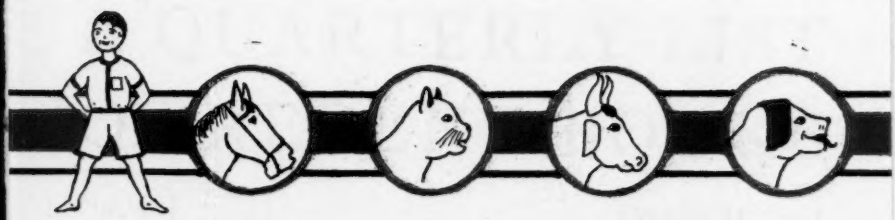

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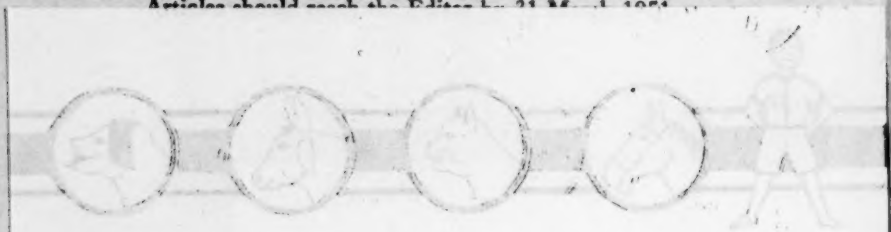

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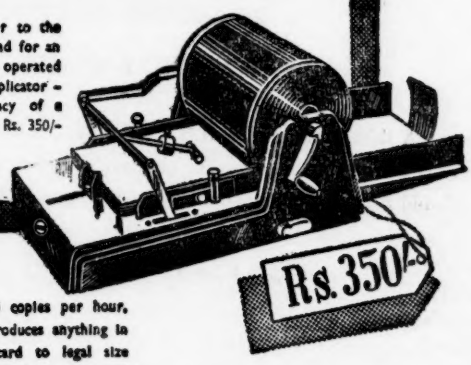

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VISUAL AIDS AND THE BIOLOGY TEACHER

These Make a Great Contribution to the Socialization of Education

THE RESEARCH WORLD

THE use of visual aids in the study and teaching of biological science is by no means new. The biological organisms which we study are material things and are, as it were, an aid to their own understanding. The work of the early students of this science are known to us through their exquisite drawings and paintings which were made, first as records of research work, and secondly as means of demonstration to others. The research worker in modern times has many more technical devices at his disposal and, so far as these are of visual type, there are few fields of knowledge in which they have been more widely and more successfully applied than in the biological sciences. Through the simple lens, the compound microscope and the micro-projector we have been able to see, and to show to others minute detail. With the aid of photography we have been able to record our observations in a manner almost free from the chances of subjective distortion. The development of new photographic materials, such as colour films, panchromatic and infra-red materials and quartz lenses and ultra-violet illumination, have given us even greater powers to record, to analyse and to demonstrate. Phase-contrast photography with differentially polarized light has opened new fields to us in research work. The invention of the electron-microscope has allowed us to photograph objects of such ultra-microscopic size that they escape our finest filters and are invisible even to the highest powers of the ordinary microscope. Nor must we forget that motion picture photography and cine-photo-micrography have made possible the study of high-velocity and small-scale movements, to which we owe our understanding of many mechanical problems in biology, such as ciliary action, the locomotion of fish and the flight of birds. Finally we should remember that in the wider fields of applied biology and cognate subjects visual methods have greatly extended our

powers of observation, recording and analysis—witness aerial survey of vegetation forms, X-ray photography in surgery and diagnosis and the photochemical location of intestinal phenomena.

The Educational World

While all this work is, in a sense, educational, there are more restricted fields, in the school for example, in which there are equally wide opportunities for the application of visual aids. Education, in the last ten or fifteen years, has been characterized by two great movements, visualization and socialization. That these movements are interrelated is already realized. That they could be bound still more closely together needs to be more widely realized. The aim of this article is not only to show how the teacher can make better use of visual aids in the teaching of biology but also how, by a visual approach to biology, this subject can make an even greater contribution to the social functions of education.

Before turning to the more restricted aspects of our subject it is well to give a little attention to the question of the socialization of education. Right through history Man has been faced with the problem of helping his children to grow up to become acceptable members of his society. This social purpose of education can never have been more clearly its sole purpose than in the remote past, before the habit of abstraction and the increase of social complexity led, through specialization, to a divorce between what man did and the means of satisfying his primary needs. As the process which we call civilization proceeded, education became less and less of a process of socialization, and more and more one of instruction in formal and abstract disciplines in which ability to remember was taken to be more important than capacity to do. At last the pendulum is swinging again, towards the social functions of education. Social studies, social education, fundamental education, the search for experience as the setting for knowledge, these are the criteria of change towards a new interpretation—the idea that education is 'social philosophy in action'. There is, moreover, an extremely important point here. The task of education is not merely to fit the individual into society as he finds it, but also, through its action on the individual, to change society, to make it fit to live in.

Biology in Education

It is of extreme importance that every teacher should have a clear conception of the place of biology in education because, without this, it will be the study of form rather than of function, of types rather than of biological relationships and of death rather than of life.

First of all, biology contributes, as do other sciences, to training in scientific method. This is by no means the preserve of the physical sciences only; indeed there is growing evidence that biology is superior to the physical sciences as a training in scientific method in relation to ordinary living. That is what we want. We are not concerned merely

that our pupils should be good physicists or scientists, but that they should be good citizens who are able to benefit from the application of science to the conduct of life.

Biology in the past has been concerned with the structure and systematics of animals and plants. Later it became more experimental, with a shift of interest towards ecology and physiology. The most recent, and by far the most important, of its developments has been the move towards social biology, towards the understanding of Man as an organism which is affected by the laws of organic nature as well as by the society in which he lives.

However extensive our provision of social welfare agencies, however good our public health plans, our plans for improved agriculture and so on, they will only achieve their ends if people can understand them and learn to co-operate in them. Health education, home-craft teaching, domestic science, school gardening, hygiene, for each of these and many other topics, a biological background is essential. Biology is a fundamental first step in social progress. It is in that spirit that we must interpret school biology. It must indeed retain its basic content, but it must carry this forward and we must show how biology is a fundamental part of all that is required to understand life.

It is at this point, faced with the need to relate biology to social affairs, that visual aids can prove so valuable.

Some Characteristics of Biology

Biological science, both in the more formal academic and more recent social sense, is possessed of certain characteristics which make it particularly suitable for visual presentation. Indeed one might say that it presents some problems which, at school level, can only be tackled with the use of visual aids. The teacher who wishes to get the best out of a visual approach should be clear as to what these special problems are, just as he must turn, as we shall later, to discover what are the special characteristics of the visual approach itself. After a comprehensive study of biological education, which is published elsewhere,[1] the writer considers that the biological sciences present the following difficulties:

1. *Seasonal availability of material.* The relation between life-processes and seasonal change imposes a sequence upon school biology. In general this can be met by suitable planning, but seasons do not always keep pace with the calendar and the needs of revision and reference repeatedly call for material which is 'out of season'.

2. *Cyclic periodicity of events.* Such events as the carbon, water and nitrogen cycles or the complex life histories of parasites, although forming a clear continuum to the teacher are often beyond the pupil.

[1] Green, T. L., *The Teaching and Learning of Biology* (Allman, London).

3. *Complexity of structures, relationships and function.* Cyclic events may, instead of consisting of changes in one factor only, involve many. This is particularly true in animal embryology, where changes are both simultaneous and sequential, or in studying complex food-chains or the interdependence of organisms.

4. *Variety of scale.* Biological materials and events range from the minute to the mountainous, from the remote to that which is contiguous and from those which are rapid to those which are exceedingly slow.

5. *Unfamiliarity.* While much of our biological teaching is, and should be, concerned with what is common and everyday, this is not always so. An appreciation of the theory of evolution demands a knowledge of past life-forms, while an understanding of widely divergent ecological situations always presents difficulties to those whose life has been spent in one locality. Moreover, in much of our teaching (as in dealing with evolution and distribution) we call on the evidence of organisms which we cannot show to our pupils.

The Attributes of the Visual Approach

The entertainment screen, the growing use of the film and other media of visual education, and our long usage of pictorial and other visual aids have given to most, if not to all of us, some generalized concepts of the power of visual methods of presentation. The general problems of visual education have been discussed widely in the last fifteen years but, despite this, there is a widespread ignorance, and in particular a narrow interpretation of the values of visual aids. The writer has lately reviewed the problem in comprehensive terms.[1] Here there is only space to emphasize a few of the main attributes of the visual approach which make it particularly important to teachers of biology. These main attributes are:

1. *Control of the time-scale.* Through control of time (the temporal scale) we are able to do many things which are important in the teaching of biology. We can record the events of the present and reconstruct those of the past. We can take motions too quick for the eye to perceive (the beat of wings, cilia, etc.) and follow their movements on the screen in slow motion. We can take motions which are almost imperceptibly slow and speed them up and so gain understanding, for example, of the events of germination and growth.

2. *Control of the factor of size.* By photography we can deal with either the minute or the vast, so that there are no materials of which the form and colour cannot be reproduced in the classroom.

3. *Control of the spatial factor.* Local expeditions, valuable as they are, are yet limited. The camera can rove the world and bring it to the classroom screen.

[1] Green, T. L., *The Visual Approach to Teaching* (Oxford University Press). *In preparation.*

4. *Ability to simplify the complex.* Whether it be a structure or a process we can show it piece by piece and stage by stage by projection on the screen or by drawing and diagram on wall sheets.

5. *Ability to synthesize ideas into bigger principles.* By visual means, having simplified ideas to ensure understanding, we can build them into something more complex, into such generalizations as evolution. Above all we can show on the screen how laboratory ideas can be applied to social living.

6. *Ability to give the illusion of reality.* This is one of the final and most complex things we can do with visual aids. At its simplest we see it as the diorama, the combination of models and background paintings which, with their carefully controlled planes, achieve the effect of stereoscopy and hence of reality. Even more can we do this on the screen, and all who have seen a film of good quality have had the feeling of identification with its ideals and with its persons and have in fact had the feeling that they were there.

7. *The appeal to emotion and experience.* The illusion of reality and the readiness with which we identify ourselves with the film provides us with what we might well call vicarious experience. The educational significance of this is very considerable. As teachers, in virtue of a longer life and greater maturity, we seldom come to a subject which is entirely new to us, we have knowledge which is relevant, we know where to turn to find more information and we have well-tried methods of work. Our pupils lack these things compared with us, and one of our chief tasks is to build up for them those attitudes and that knowledge which will help them to tackle a new job with success. In brief we offer them the background knowledge which will result in orientation and the proper set towards new ideas. But it is knowledge, and not experience. It is here that we find the vicarious experience offered by the film so valuable.

The Range of Visual Aids

Before proceeding to what are more commonly accepted as visual aids a word should be said about biological specimens themselves. Actuality must obviously be part of the visual approach yet we all know that specimens are often neglected in favour of drawings, that school museums are but poorly developed and that practical work plays too little a part in our teaching. All who want to improve the quality of biological teaching in their schools should make as much use as possible of original materials. The school garden, the vivarium and the aquarium are essential if biology is to relate to life rather than death. In the laboratory, materials should be collected and prepared as demonstration specimens, work to which every pupil can contribute. Slides, dissections, skeletons, herbarium specimens, fossils—there is no end to what is available and what can be collected and prepared for use easily. For those who have done little in this way the author has collected the experience and guidance of many expert

teachers both from the pure laboratory angle[1] and from a more pedagogical angle.[2] Moreover, one of the projected volumes of the new UNESCO series is to deal with biology teaching and will deal with these matters.[3]

When we come to visual aids in the more restricted sense it will be convenient first to give a summarized review of what is available and then to turn to the question of using these aids. The commonly accepted visual aids might be classified in such a scheme as follows:

NON-PROJECTED MATERIALS USED FOR DIRECT VISUAL OBSERVATION

I. *Three-dimensional materials.* These are prepared as models, which are of several types; but all aim at overcoming problems of scale and complexity.

(i) *Scale models* which are made as nearly as possible to an exact scale and in which every effort is made to produce all the details. Such models are not easy to make and the best examples are rarely seen outside museums.

(ii) *Functional models* which place the emphasis on the mode of working rather than the structures. Some may be highly representational while others are extremely schematic. Models of the eye, of the ear ossicles, of a muscle-bone lever system and of the lungs and respiratory mechanisms are well-known examples.

(iii) *Take-apart models* combine the intentions of both the previous groups but tend to be of the scale-model type. Well-known examples are those of the eye, brain and heart.

II. *Two-dimensional materials.* Here we are dealing with drawings and diagrams, which are the most widely used method of visual presentation in biology teaching. They can conveniently be placed in the following groups:

(i) *Representational.* Drawings, paintings and photographs which show the natural appearance of biological specimens.

(ii) *Analytical.* Diagrammatic presentation which attempts to isolate the essential features, for example, a schematic diagram comparing and contrasting vertebrate and invertebrate morphology.

(iii) *Stereograms.* Drawings in which various formalized devices are used to give the appearance of solidity. This is chiefly realized by showing some of the surfaces cut away along certain planes to show underlying structures.

[1] Green, T. L., *Zoological Technique for Teachers* (Allman, London).

[2] Green, T. L., *The Teaching and Learning of Biology* (Allman, London).

[3] Green, T. L., *The Teaching of Biology*, UNESCO Handbooks for Science Teachers, Vol. VII (Oxford University Press). *In Preparation.*

These are extremely valuable for the teaching of biology and are not so difficult to make as most people imagine. Hints on doing this, and on other aspects of visual methods, will be found in a forthcoming book by the writer.[1]

(iv) *Graphical.* Many biological phenomena are conveniently presented in graphical form. Where exact data are available, for example in studies of growth-rates, the conventional algebraical graphs can be used. Where the data is quantitative, but one is concerned with general trends rather than exact study, it is better to use one of the pictorial graphical techniques, such as that developed by the Isotype Institute.

Projection Techniques

I. *Still Projection*

(i) *The projection microscope* or micro-projector consists of a microscope adapted to project an image on a screen. Very many commercial models are available and an ordinary microscope can be used with a strong point source of light and a condenser. The image can be projected on to a screen with the microscope tube horizontal or, if the instrument is on the floor with the tube vertical, the image can be projected on to a ground glass sheet, or a sheet of tracing paper laid on a flat glass plate. It is not difficult to build a workable micro-projector from scrap materials.

(ii) *The standard or magic lantern* projects from slides which are $3\frac{1}{4}$ inches square. This, the earliest visual apparatus used in schools, is too well known to need further description. Its chief disadvantage is the use of specially made photographic slides. For many purposes, however, slides can be made by other less expensive and easier methods, such as:

(*a*) Drawing in coloured inks on tracing paper which is mounted between two sheets of glass to make a slide.

(*b*) Drawing with glass ink or wax pencil on glass plates.

(*c*) Scratching the diagram on to a sheet of heavily smoked glass and binding it up with a cover glass.

(iii) *The episcope* which projects direct from postcards, pictures in books and so on. No slide-making is involved but the use of reflected light reduces the brilliance of the image, a difficulty which can be overcome by using back-projection on a translucent sheet, either with or without a mirror.

[1] Green, T. L., *The Visual Approach to Teaching* (Oxford University Press). *In preparation.*

(iv) *The epidiascope*, an instrument combining lantern (diascope) and episcope in one, with corresponding increases in bulk and price.

(v) *The miniature projector*, now perhaps the most used of still projectors. In place of glass slides of standard size it uses strips of cine-film, 35 mm. wide, on which the pictures are printed in one of two sizes, single or double frame (18 × 24 and 36 × 24 mm. respectively). Hundreds of film strips are available and biology is well represented. These strips, carrying up to 40 pictures, roll into a cylinder only $1\frac{1}{2} \times 1\frac{1}{2}$, they are light, unbreakable and cheap. Their chief disadvantage is that the order of presentation is fixed on the film—but the teacher does not have to follow this. Some models also take miniature glass slides of 2 × 2 inches. These allow one to shuttle pictures in any order as required.

In countries where electrical supply is not universal a difficulty arises. In the case of micro-projectors and miniature projectors this can be overcome by using a 6- or 12-volt lamp and a car battery—but one is dependent upon facilities for recharging. Miniature projectors can be operated with kerosene lamps, and 'lime-light' sets are available for the larger lanterns. The writer is at present experimenting with sunlight as a projection illuminant.

II. *Moving Picture Projection*

Although several sizes are available, the vast bulk of educational films are made on the 16 mm. film and can be sound or silent and black-on-white or colour. This is the most potent of the visual aids and a vast amount of biological material is available.

Cost is of course a major factor. It should be noted that for the vast majority of teaching situations, especially in biology, silent film will do many things as well, and some better, than sound films. Silent projectors are smaller, easier to handle and cheaper than sound machines.

The problems of an adequate supply of films and machines for use in India has yet to be solved and, perhaps for a long time, the biology teacher will not have these available on a big scale. Thus, valuable as the moving picture is, we are more properly concerned here with still picture projection—and even more with those materials and methods in visual aids which the teacher can handle on home-made lines.

Making Visual Aids

The time will never come when the biology teacher will be provided with all the visual aids he needs. Nor should it be allowed to come, because such conditions would deprive the teaching situation of a chance to do a job on its own. Those who make their own visual aids can tackle what is exactly their problem and suit their production to

local needs. Moreover pupils can, and should, help with this because such experience is a valuable way of learning and of bringing teacher and taught into sympathetic relationships.

It is not possible here to enter into details but at least one can suggest lines for exploration. Fuller details will be found in other places[1] of these and many other visual methods.

1. *Apparatus.* The apparatus used in visual aids is often expensive. It is however possible for any teacher who has a few hand tools at his disposal to make some things for himself. The writer has worked out simple designs for such things as screens, daylight projection sets, a small lantern, an episcope and a film-strip projector.[2] With these possibilities—and with the use of common sense—there is no reason why a school should be completely devoid of visual aids apparatus.

2. *Models*

(i) Plasticine, glitter wax and the like are excellent for small models in biology.

(ii) Excellent work can be done with ordinary potters' clay, though for very fine detail, artists' modelling clay is superior. These clays can be worked to shape by hand and a few simple tools cut from wood, or with the aid of a knife and the handle of a spoon. The writer's pupils have, in this way, made models of hearts, the eye and ear, the brain and so on. Plaster of Paris is used for copying models with the aid of moulds and casting.[3] These clays can be air-dried, coated with a solution of size and then coloured with oil or water paints and finally varnished.

(iii) Plywood or thick cardboard is good material for making functional models of bones, e.g. ear ossicles, jaw apparatus and so on.

(iv) Functional models to show the action of the lungs and so on can be made with glass tubes, glass bottles and tubing.[4]

3. *Two-dimensional materials*

(i) In these days of illustrated magazines and papers a vast amount of material useful to the biology teacher is easily obtainable. Pictures, diagrams and charts should be cut out and carefully preserved. It is wise to paste these on

[1] Green, T. L., *The Visual Approach to Teaching*; *Look and Listen*, A Visual Aids Magazine (United Trade Press Ltd, London); Green, T. L., *Making and Using Film Strips* (Pitman, London).

[2] Green, T. L., *The Visual Approach to Teaching* (Oxford University Press). *In preparation.*

[3] Green, T. L., *The Teaching and Learning of Biology* (Allman, London).

[4] Green, T. L., *Biology in the Secondary Modern School* (Allman, London). *In the press.*

to a backing sheet—newspaper will do—and varnish the surface. For convenience in use it is best to keep each picture separate—they can be mounted temporarily in groups when required.

(ii) Charts and diagrams can be drawn by pupils, and teachers, to illustrate special points. While good cartridge paper is ideal it is unfortunately very expensive. For this reason the writer has often used ordinary newspaper. First paint it over with a coat, or two coats, of flat white poster paint. Next draw in and paint the desired diagram with bold lines in black or thickly saturated colours.

(iii) Remember that diagrams and charts in books can be enlarged very easily. Where exactness is not essential do it freehand. Otherwise draw lightly on the original a series of squares, like graph paper, with lines one tenth of an inch apart. On a large paper sheet draw a grid with lines 1 inch or 2 inches, etc., apart. Then copy freehand from the small to the large squares, thus getting 10 or 20 etc., times enlargement. By projecting the picture with the episcope on to a big sheet of paper wall charts and diagrams can be prepared easily and accurately.

Using Visual Aids in Biology Teaching

There is one, and only one, golden rule—visual aids are a means to an end, and are not ends in themselves. The ends we seek are something to do with children, their knowledge, their attitudes and beliefs. The moment we forget this, and become absorbed in our model-making or our machines, then we have ceased to make the best use of visual aids.

While visual aids of many kinds have been available for a long time it is only in recent years that they have really been explored. Now, with research and growing experience, we can say that they are a valuable aid to learning in many ways. We must however learn to use them properly. To this end attention should be given to the following points:

1. The teacher must know what he wants to do, he must have defined the exact purpose for which a visual aid is needed, and have made, bought or borrowed one specific to the particular problem. In other words he needs to know the pupil and problem and the potentiality of the aid he proposes to use.
2. Visual aids need to be used in a way which invites and initiates a pupil response. If they are used in a purely passive way they may add to understanding, but are more likely to be treated as one more thing to be remembered.
3. They must be an integral part of a lesson, or series of lessons, not something merely hung on the wall and left to chance.

The teacher must, as it were, lead up to a point and say, 'Well, here we're stuck, here we need help. Now look at these pictures, or this film—see if you can find a way out of our difficulty when you see it.' The class must be looking for something, seeking a clue.

4. Perfect organization is essential. The pictures must be ready, the projector set up, everything at action stations. To waste time looking for the screen, or struggling with the wires, or hunting for the right diagram is more than a waste of time, it turns an aid into a hindrance and it causes one to lose the psychological moment.

5. One should never expect to get everything out of visual aids at the first shot—even if it is but a single simple diagram. Turn to it at the right moment. And go back to it as often as required—this is when it can be left on display for further reference. And such reference should be encouraged, just as much as turning to books—but it is only possible if the various visual aids are suitably mounted, catalogued and readily available.

6. In using film strip, and still more the moving film, remember that some kind of orientation is essential. This can be done by discussion, by giving a brief outline and so on. A film should be shown right through and talked about as a whole. Then one can turn to specific details and, with these in mind, see the whole thing again. After more talk, or more practical work, one can come back to it, or to parts of it. Finally one should go through the whole thing as a final résumé. No one should feel that he must use a film strip or a film as a whole, or once only, or even for the purpose the maker intended. The teacher must use visual materials for his own ends—not let them dictate what he should do.

7. Pupils should join in the collecting and making of visual materials and group work should be encouraged. But do not let it be forgotten that they are learning about biology, not visual aids.

8. Visual aids should be organized into convenient units. These units can deal with major ideas and be broken up into sections which deal with details. A key chart should always be prepared to show how the whole scheme hangs together. This key should have two aspects. One to show the work which has to be done to understand a particular subject and those responsible for doing it. The other should show the layout of the visual material which has been or will be prepared. Unless a key is made and the materials well indexed they will not be easily available for future use.

Preparation of visual units will raise many problems for discussion—and some difficulties. An important point is to remember that you can make a visual unit and leave gaps in it to be filled by borrowing or hiring films, etc., when required.

The making of these units soon leads to exhibitions and museums. If it does, they have been effective—and, however small the school, a biology museum is a useful thing and one to be encouraged.

9. Do not forget that the drawings which pupils make are visual aids. They should be stage-by-stage records of what was done and how it was done—not mere drawings of a completed job, such as a dissection. That is of little, if any, value for revision.

10. The most important thing of all is to use visual aids to stir up interest in the social aspects of biology. Children will learn all about hookworm—but not change their habits unless their attitudes have been changed. Visual aids—the vast array of films and film strips, the charts and diagrams made at school, the cuttings from magazines—can put up an irresistible argument which will affect not merely the understanding, but also the emotions. If the biology teachers of the East could bring about even small changes of attitude they would do more to rid their country of the effects of infection than the doctors themselves.

Conclusion

In a short article nothing can be described in detail, but the teacher can learn most of it by that oldest of all methods—having a go. The exploitation of visual education does not depend upon money for apparatus, but on the readiness of the teacher to make his own visual aids when he cannot buy them. Home-made apparatus and materials could bring about a revolution in the schools and a new society in the future. And, above all, let it never be forgotten that visual images are written in a language which everyone can understand.

T. L. Green

NEW PLANS FOR ECONOMICAL SCHOOL BUILDINGS

Two Experiments Worth Trying

I. An Assembly Hall

Few middle or high schools permit themselves the luxury of an assembly hall, and yet this is the most important part of a school building. The cost is not as prohibitive as it may seem at first, and the uses of such a hall increase from year to year.

St Paul's High School of Raipur, M.P., has an enrolment of approximately 500. Rs 15,000 was available for an assembly hall and so we set out to get the maximum space and utility possible for the amount.

The hall is not strictly speaking a hall, but a *pandal* or pavilion with a compound wall around it to secure privacy, give control over those to be admitted into the audience, and also to keep out cattle and other nuisances. Some people ask, 'Why not a walled building instead of an open building with a compound wall?' The answer is that this arrangement is cheaper, it permits the accommodation of an overflow audience sitting on the outside, almost as large as the audience sitting within, and we prefer the open air. In addition the *pandal* can be used as a gymnasium or a playing-field on rainy days much better than a closed building.

One thousand people can be accommodated in the *pandal* provided they sit on mats on the floor. When the number is not too large we put benches or chairs in the rear for visitors to sit upon. If the audience is large, the chairs and benches are put outside the building against the compound wall. One can hear just as well there as nearer to the stage. We were a little concerned about the acoustics before the building was completed. We found to our surprise that the asbestos-cement roof gave no echo when there are no sides to the building, but acted as a sounding board which enabled one to hear as well at the back of the hall or anywhere within the compound as near the stage. By using the compound in addition to the building, we can accommodate between 1,500 and 2,000 people. Thus we have a building that looks cosy for smaller groups and yet can accommodate a really large audience.

If we were building it over again, I think we would slope the floor so that the back is about two feet higher than the front. This would give a better view to those in the rear, and the slope would not be so great as to prevent using the hall as a gymnasium on rainy days, nor would it interfere with the placing of desks during examination time.

The 'green room' can be adapted to meet the need. Some might prefer two or three small rooms instead of one larger one, and include a washroom.

We have canvas curtains which can quickly be put up on the sides to keep out the excessive sunlight, or the rain driving in from the side, or to break the hot winds. These curtains are almost as satisfactory as

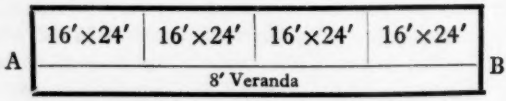
having the building enclosed on those few days when required. More often than not the *pandal* exposed to the open air and light is preferred.

There is one drawback however. The building cannot be darkened to permit cinema or other projector shows during the day. We regret not having made the green room a little larger so as to accommodate at least two sections of students for projection or cinema shows during the day. The green room can be darkened. But at night we have frequent cinema shows as a part of our audio-visual education programme and these are regularly attended by a thousand or more students and visitors. Some of the more frequent uses to which the assembly hall is put are assemblies including lectures, demonstrations, dramas, inter-class debates and activities, playground on rainy days, examination hall (200 desks can be accommodated), cinema and lantern shows and exhibitions. The use of the hall is also given over to civic events, adult education and lectures for the general public from time to time.

The building was completed in 1949 within the Rs 15,000 allotted and included electrification and the building of the compound wall. Steel trusses are preferable to the wooden ones but were not available at the time of building. The cost of steel trusses should be about the same. I have seen assembly halls that cost three times as much but I would not exchange them for our airy, roomy *pandal*.

II. The Primary School for Four Classes

The plan of this building is briefly this. A simple building consisting of a row of rooms and a veranda was first contemplated. The rooms were to be size 24′×16′ and the veranda 8 feet wide, as follows:

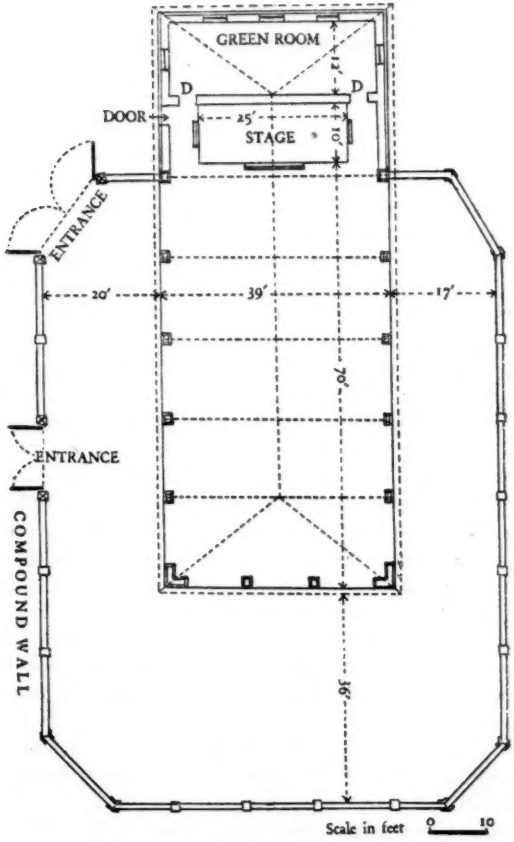


There were two complaints against this building. (*a*) The rooms were too small. (*b*) The veranda would undoubtedly be occupied by roving cattle and therefore be fouled every night. To build a large compound wall or maintain a fence in the particular location was expensive or otherwise impractical. So we decided to partly enclose the veranda up to a height of three feet with a wall and above that with expanded metal mesh. This would both give privacy and keep the school cool. Then the suggestion was made that since the veranda was enclosed, why not omit the wall A to B entirely? This would give us much more room. Classes now meet inside the 16′×24′ space most of the time, but can move into the veranda, or rather corridor space, whenever desirable. (See p. 89.)

It was found that the classes enjoyed almost as much privacy during teaching periods as if the wall A to B were in existence. The wide

Assembly Hall or *Pandal*

At the St Paul's High School, Raipur, M.P.



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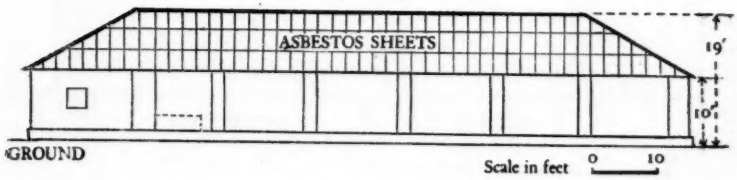


ELEVATION

corridor gives a feeling of roominess and fellowship between the classes during the recess that one simply does not get when each class is separated by four complete walls. There is sufficient room in the corridor next to the outside wall for sand trays and other materials for visual education and handwork. If greater privacy for each class is wanted, three small curtains can seal off each room.

Two of the classrooms are separated only by a curtain as the moving aside of the curtain makes available a double room which easily seats the entire student body. Thus an assembly hall is available. The headmaster or headmistress is in close touch with each class.

A feature of this building is the large blackboards which cover all walls but one, from the floor to a height of six feet. Some classrooms thus have as much as 400 square feet of blackboard. Why have blackboards down to the floor? So that small children sitting on the floor can write or draw with ease and comfort. In a middle school the blackboards can be fixed two feet above the ground. This much blackboard space is not an advantage where the blackboards are not kept in good condition, but where teachers delight in putting attractive illustrations in coloured chalk on the board and where children use the blackboards very freely it is really a great advantage, particularly in primary schools.

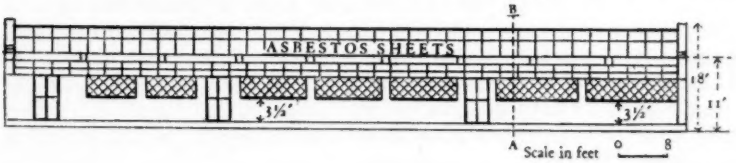
We have an asbestos-cement roof, but the roof might be of tile, tin and tile, or even grass for that matter. Asbestos-cement is warmer and noisier than the other materials listed. The heat is less oppressive than it might be because neither of the long walls go to the ceiling and therefore breezes blow right through the building. The open nature of the building also improves the lighting.

The cost of the building was Rs 12,000 in the year 1948. It is located in a city of 100,000 people. Practically all inspecting officers concede this to be the pleasantest and most practical primary school building they have seen.

We intend to plan similar buildings for middle schools. We will probably lengthen the short walls two feet in order to reduce the width of the corridors and give more space to each class. However, we may decide that curtains (which absorb noise better) in the corridor, to block off each room, meet our need better.

E. W. MENZEL

Salem Girls' Primary School, Raipur, M.P.



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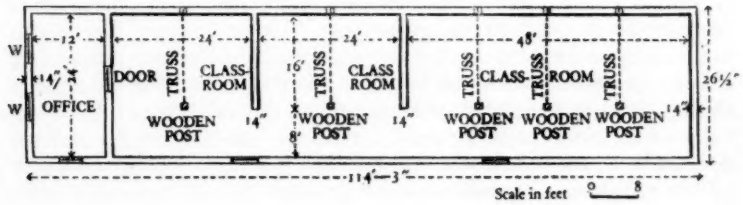

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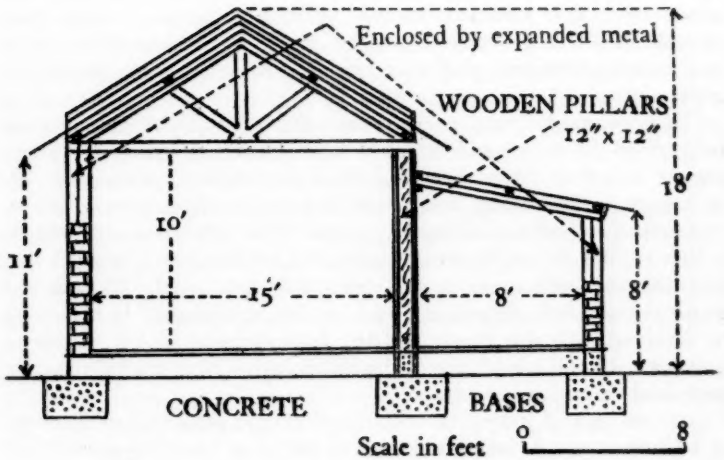


SECTION A–B (side-view)

A BASIC PROGRAMME OF GUIDANCE

Must be an Integral Part of School Organization

THE importance of educational guidance has been realized by all the people who are interested in the well-being of the future citizens of our society. Increasing complexity has brought about specialization in every field of human endeavour. Social and institutional needs have become almost infinitely varied. Industry is minutely specialized and vocationalized. Political and civic problems are becoming more numerous and more intricate. At every turn the individual is confronted with necessary choices. Therefore the guidance department should become an integral part of the school organization. The enrichment of the curriculum, with its consequent introduction of the elective principle, is not only an accompaniment of social changes, but is also a necessary outgrowth of the recognition of individual differences. Hence a guidance programme is inherent in the gradual democratization of the school in curriculum, discipline and method. We in India are not very serious in organizing a department of guidance, either at State or local level, and it is in the fitness of the present situation to suggest a basic programme of guidance necessary for every educational institution worth the name.

Study of individual differences. A study of any group reveals differences among the individuals composing it. These differences may be in terms of intelligence, command of fundamental tools of learning, physical and emotional maturation, social abilities, specific aptitudes, interests, and other characteristics. Furthermore, not only are there infinite variations among individuals, but each differs from himself from time to time. So vitally do these variations affect mental and emotional growth, that their existence must never be ignored by anyone who works with young people.

To understand others and to work effectively with them, one must understand the nature and extent of their differences. It is not enough for the school to know that a boy is a poor reader. How great his deficiency is and what specific difficulties he encounters must be understood if real help is to be given. This information should be a part of the school record, available to all the school officials and teachers who have contacts with the pupils concerned. Mere access to the records will not suffice. Each teacher should grow in his ability to interpret and use them; and the best measure of his success in doing so will be his ability and willingness to interpret unpromising data in an objective manner.

Any analysis of individual differences should lead to the discovery of individual needs, and the extent to which a school discovers and provides for individual needs determines the adequacy of its programme. Because individuals differ, it follows that some opportunities are better

for some individuals than others. Helping the pupil to choose, prepare for, and find his place in the field into which he fits best is the fundamental of a guidance programme. He will be most likely to make a wise choice if he has adequate knowledge of his assets and his limitations, the personal and skill requirements of the occupational field of his choice, and the area and incidence of the occupations considered, as well as the aid of a competent, sympathetic counsellor.

When a school helps its pupils adjust to immediate conditions, both in school and out, and guides them in their choice of school opportunities and their planning for the future, it is on its way to an effective guidance programme.

Making the programme. A common-sense approach to the formulation of a guidance programme for a school is to ask: What guidance do boys and girls of today need? This is the answer:

1. Each boy or girl will need to know his assets and limitations as indicated by school grades, extra-curricular activities, hobbies, work, and out-of-school experiences. This must be a matter of record available not only to the pupil but to all school officials and teachers who will deal with him from time to time. Therefore, we should begin with an adequate pupil inventory for each pupil in the school.

2. Intelligent choosing and planning cannot be done by the pupils. They are the result of information on the part of the individual about his own assets and liabilities and also the personal and skill requirements of a number of specialized occupations in the broad field of his interest. Current information as to the place and number of available opportunities, local and national, must be at his command. The school, therefore, has the obligation to maintain a continuous occupational information programme, which will help the individual to know and understand the world of work and make a satisfactory adjustment to it.

3. The immature pupil will need, in addition to the knowledge of his assets and limitations and information about available opportunities, assistance in formulating from these data an intelligent plan of action. Helping pupils to make such plans for immediate and later school life and for the larger responsibilities into which they will enter, will be the Counselling Service of the school.

Working the programme. The school that is considering introducing a guidance programme might well begin with the following steps:

1. Make sure that the teachers become familiar with and are willing to accept the purposes and services of a guidance programme. To this end employ teachers' meetings, suggested readings, and committee reports.

2. Select the best qualified teacher in the school to take charge of the programme. Give this teacher at least one full period every day for guidance activities.

3. Determine the adequacy of your pupil inventories and take the necessary steps to strengthen any weaknesses discovered.

4. Get the facts about your pupil population in reference to

stability, withdrawals, age-grade distribution, mental ability, mastery of the tools of learning, and educational and occupational interests.

5. Start an occupational file and a guidance shelf in your library.

6. After the principal and the members of the staff have decided what guidance activities will constitute the school's programme, the best results will be obtained if the various responsibilities are assigned specifically to some one person or group; otherwise, what is everybody's business will soon become nobody's business. The principal can best perform some of the duties involved, but activities which presuppose specialized training and specialized knowledge will fare better in the hands of the person primarily responsible for the programme. The performance of specific tasks may well be assigned to members of the committee. Everyone on the administrative and instructional staff must make planned and correlated contributions to the guidance programme if it is to function effectively for pupils, school, and community.

Things to do. Despite variations in personnel and resources, any school, regardless of size or location, can perform a number of guidance services if it is determined to meet some of its pupils' needs in the field.

A list of guidance services follows:

1. Set up a definite schedule for securing throughout the year data for the permanent record card.

2. Have a folder for each pupil, thus eliminating the copying of supplementary data and encouraging their accumulation.

3. Devote at least one staff meeting a year to the interpretation and use of the inventory.

4. Have a testing programme that covers rather comprehensively the last six years of the school period. Record the result on one sheet in percentiles, so as to give an over-all view of abilities. The programme should include standard tests in intelligence in reading, and in arithmetic in the sixth and eighth grades; a clerical and mechanical attitude test in the ninth grade; a general achievement test covering the mother-tongue, natural science, social science, and mathematics in the tenth grade; and a college aptitude test in the high school, preferably in the tenth class for pupils who plan to attend college.

5. Encourage the study of the pupils' inventory when a course or vocation is being chosen or when there is to be a change of subject; also when failures, poor attendance, tardiness, behaviour difficulties and other evidences of maladjustment are being considered, as well as when preparation is being made for a counselling interview.

6. From time to time review with the pupil the record he is making, in order that he may get a developing picture of himself and his potentialities. Suggest possible desirable adjustments.

7. Include and use anecdotal records, teacher's rating-scales and similar material, which will aid in counselling in problems of attitude and personal adjustment.

8. Encourage the class teacher to use the pupil inventory in order to get a bird's-eye view of the sections he will teach. The bird's-eye view may include the range of intelligence, reading and arithmetic abilities, previous success in a particular subject, other relevant details, and something of the home background. In addition, the teacher may use a questionnaire to obtain from the pupils information which may be pertinent to the subject being taught.

Occupational information. 1. Provide in the first year of the high school a classroom unit on occupations. This instruction should emphasize the place of work in the individual's life, the interdependence of workers, number and kinds of jobs in terms of skill and training required, distribution of national income, sources of information about jobs, specific information desirable for any job, kinds and locations of jobs former pupils of school secure, etc., rather than a systematic study of numerous occupations.

2. Correlate occupational information with regular school subjects and with the subject-matter taught, but only to the extent that the individual teacher is willing to prepare himself in the essential background.

3. Provide an opportunity for the pupil to study intensively in his last year of school two or three occupations in the field in which he is most interested.

4. Have in the library a shelf for occupational books, college catalogues, and pamphlets.

5. Make a survey of occupations in the community. Pupils may assume certain responsibilities in this connexion if the enterprise is carefully planned.

6. Take the class to local industries, but make arrangements in advance.

7. Invite men and women from different fields of work to describe their respective occupations in order to arouse the interest of the pupils. Speakers should be provided in advance with an outline of suggestions.

Counselling: the principal and the counsellor. 1. Release the best qualified member of the staff for at least one period a day to organize the programme and do counselling. One period a day for each hundred pupils is considered a modest provision for counselling.

2. Encourage the counsellor to acquire a background of professional training, which includes courses in principles and practice of guidance, utilization of Test results, techniques of counselling, teaching of occupational information, mental hygiene for the classroom, and problems of business and industry.

3. Give the counsellor a private office, the best space available for confidential discussion, and allow him definite hours for counselling.

4. Place upon the counsellor the responsibilities for the testing programme. The work of giving and recording the test may be assigned to some member of the guidance committee.

5. Work out with the counsellor a definite plan for the selection of subjects in the school.

Additional responsibilities of the counsellor. 1. Identify all pupils who have unusual talents and those who have unusual problems.

2. Know the occupational and educational interests of the pupils. The importance of such knowledge increases as pupils approach their last year in school. From time to time, review their school progress, to see if individual conferences are needed.

3. Locate during the first month of school all average and retarded pupils who will probably not finish high school.

The place of the teacher. Teachers, as they deal with boys and girls in varying situations from day to day, have the best opportunity to get an over-all view of the problems of youth. By observing the needs of boys and girls and acting constructively to meet these needs, teachers can be key factors in a guidance programme. The contribution of teachers will depend upon their knowing what is to be done and how to do it. In most cases such information and techniques will have to be acquired. Provision for this in-service training is essential in planning any guidance programme.

S. N. UPADHYAY

NIGHT SCHOOLS

A Need for Radical Reforms

INSTRUCTION at night is given in a variety of subjects, commercial, technical, and regular secondary school subjects. Social education for the ignorant and illiterate has lately been added to this list. I do not propose to discuss all aspects of night instruction. For the purpose of this article I have chosen night schools imparting secondary education for standards V-XI.

To understand the special nature of these night schools, and all the handicaps of the teachers and the taught, it will not be out of place to consider the normal conditions laid down by the Grant-in-Aid code for conducting such schools. The conditions are four:

(1) That the night school works for at least two hours a day for five days in a week. (2) That no pupil below the age of 12 is admitted. (3) That no pupil who attends a day school also is admitted. (4) That the school shows an average attendance of at least 30 pupils throughout the year.

It must be admitted that these conditions for the registration of a night school for grants, laid down by the Department of Public Instruction, are minimum and liberal. In all other matters, such as the annual inspection, auditing of accounts, etc., these schools are on a par with the day schools.

The present state of affairs in these schools is not very encouraging. Though the minimum number of hours of work laid down by Government is two hours a day for five days in a week, all night schools work for two and a half hours on all days except regular public holidays. There are a few which work for three hours every day. Even then the results of the S.S.C. Examination reflect badly on the amount and quality of instruction imparted. This is due to two reasons. First, the teaching staff is mostly untrained, unqualified and in many cases engaged in clerical or other duties by day which are far from being helpful to the vocation of a teacher. People working for the sake of a little extra income, without any love for or sense of responsibility in teaching, necessarily hamper the progress of the pupils in their charge. On the other hand the managements of such schools also try to employ teachers on minimum salaries and thereby to save money, as there are no Government scales of pay for teachers in a night school. The present average salary of a night school teacher is Rs 40 per month. Will this ever attract efficient men to this profession? This is one side of the picture. Let us now consider the pupils.

The pupils of the night schools come from varied occupations. There are peons from offices, workers from factories and workshops, millhands, shop assistants and boys who deliver milk and newspapers from door to door. A minority of them have their own businesses and

some undergo practical training in painting, tailoring, carpentry and similar crafts.

Although they come to the school after eight or nine hours of strenuous work, these pupils show a great desire to study and continue their education, mainly in order to better their prospects. They are very enthusiastic about their work in the school. But circumstances and nature are against them, and their enthusiasm cannot continue for a long time. It is fatigue which saps their energy. Mental and physical fatigue do not permit them to concentrate and grasp what is taught as easily as the boys in a day school do. They fall asleep sometimes in the classroom. This is to me the greatest handicap, which makes it necessary for the teacher to change his methods of teaching. There is little time at the disposal of the teacher and the taught. No homework or supplementary reading is possible, and hence essential information only has to be imparted, and this cannot be discussed at length. All written work also has to be done in the school only. The courses of study being the same as those for the day schools, and the time at their disposal being only two and a half hours a day, the teaching methods in a night school differ widely from those in a day school.

The following will help us to understand this better:

> Usually night schools work for $2\frac{1}{2}$ hours on all week-days. Every day there are five periods, three of 30 minutes each and two of 25 minutes each. There is a short recess of ten minutes after the third period. These periods are allotted to the various school subjects, thus:

	Standards V–VII	Standards VIII–XI
English	6[1]	10
Mother-tongue	4	4
Second language	4 (Hindi)	5 (Sanskrit, Ardhamagadhi, French, etc.)
History	3	2
Geography	2	2
Science	2	2
Mathematics	5	5
Handicraft	4	...
Total	30	30

[1] English is now taught in Std VII only. In Stds V and VI these English periods are used for other subjects.

The weekly time-table given below will give a clear idea of how these periods are arranged:

	Periods & Time P.M.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	7·30–8	Mother-tongue	History	Mother-tongue	History	Mother-tongue	Mother-tongue
2	8–8·30	English	Mathe-matics	English	English	English	English Comp.
3	8·30–8·55	Science	Sec. Lang.	Geo-graphy	Science	Sec. Lang.	English Comp.
	8·55–9·5			RECESS			
4	9·5–9·35	English	English	English	Sec. Lang.	Mathe-matics	Mathe-matics
5	9·35–10	Sec. Lang.	English	Mathe-matics	Mathe-matics	Geo-graphy	Sec. Lang.

Readers will notice the difficulties in the time-factor. The elaborate approach to every subject advocated by modern theories of teaching cannot be put into practice here. Therefore the following procedure is adopted:

1. Pupils are asked to come prepared with the portion to be taught.
2. Detailed discussion of the subject by the question-answer method is avoided to save time, and instead only the important points are stressed, leaving the pupils to fill in the gaps.
3. Summaries are dictated or written on the blackboard.
4. Necessary written work is done in the classroom.

Due to the special nature of these schools, instruction in some school subjects is impossible if they are really to be taught and not merely placed on the list of subjects taught in the school. Take the cases of drawing, and physics and chemistry. Electric light is not congenial to drawing, especially design drawing. The pupils' eyes are strained and accuracy is affected. The values of colours are changed and good colour-work cannot be achieved. As for physics and chemistry, the time is too short for practical experiments in the laboratory and it is useless to teach these subjects without practical experiments. It has always been found more convenient to teach physiology and hygiene instead.

Though of an average age of seventeen, the night-school pupil is an adult as far as his outlook on life is concerned. He is more mature and hardened than most of the day-school pupils. This calls for a man-to-man attitude towards him on the part of the teacher.

The fatigue factor, though the greatest, is not the only handicap of the night-school pupils. There are several others, chief among which are (*a*) occasional night-shift work, (*b*) unemployment and (*c*) poor home conditions. These, singly or all together, offer tremendous difficulties. Night shifts compel the pupil to absent himself from the school. Unemployment causes loss of interest in scholastic pursuits and

sometimes results in a long absence. Last but not least are the home conditions. Heart-breaking tales of low wages, responsibility of supporting a large family and lack of accommodation are disclosed by many pupils to their sympathetic teachers. It is noticed that due to these handicaps only a few pupils can avail themselves of secondary education for more than 3 or 4 years. This results in a great waste. To watch the great struggle between such circumstances and the earnest desire to learn makes one admire the mettle of these persevering night-school pupils.

Another important recent development is the abolition of English in the first two middle school standards, namely standards V and VI. This has adversely affected the night schools and many of them had to close their English classes. Night-school pupils are anxious to learn English and without English these two standards have no attraction for the pupils. There are some who wish to take up only English as a subject for study in the school. But this cannot be arranged nor can it be encouraged in secondary schools preparing pupils for the S.S.C. examination. These pupils, then, are absorbed by private unrecognized English coaching classes.

It is these facts that clamour for an inquiry and a radical reform in the management of these schools. The Government of Bombay deserves all praise for the recent establishment of an inquiry committee to study the problem of the night schools and suggest measures for improvement. Not long ago the Ghate-Parulekar Report recommended that the fees charged in these schools should be half of the minimum sanctioned for day schools and that the Government should pay grants equal to 50 per cent of the actual expenses incurred. While applauding the latter recommendation, I fail to understand why half of the normal fees should be charged when the pupils are wage-earners and when the subjects taught are the same. The average fees charged today are Rs 3 per pupil per month, and these are not sufficient to maintain a high standard of work. I feel that in order to improve the standard of teaching, it should be made compulsory for the managements to appoint a trained, experienced and qualified staff on attractive salaries; and for this normal fees should be charged. Though the teacher teaches only for two hours out of the two and a half, as laid down by the Ghate-Parulekar recommendations, he has to utilize all his energy to complete the course of studies in the short period, with greater concentration, and hence he deserves a better salary.

Apart from these monetary problems there are other suggestions for the consideration of the Government educational department and of educationists:

1. The Government would do a great service to these needy pupils if it enforces by law permanent day-shift work for everyone attending a night school, till the completion of his studies.
2. A joint organization of all the night schools and the Government, in co-operation with the present Employment Exchange

Bureau and the chief commerical firms, should be established to find suitable employment for the temporarily unemployed and so help them to carry on their education.

3. A centrally situated cottage industries institution, run by the night schools as a combined effort, will also be very useful for the unemployed pupils. Workers may even be appointed here on a permanent basis. Gradually this industries centre may develop into an important manufacturing centre purely staffed by pupils. Would this not be a dream come true, according to the Wardha Scheme?
4. Regular home visits, sympathetic inquiries about the home conditions of the pupils and proper guidance in matters of difficulty will not only solve many of the social problems of the pupil but will also create a confidence in himself for the work taken in hand.
5. It has been noticed that the long vacations, like the Diwali and the summer vacation, are a waste in the life of a night school. These may be utilized with advantage if the major part of the vacations is used for regular teaching work. Teachers should be assigned this work in rotation and should be paid extra for it. The suggestion to make Sunday a full working day, with some day in the middle of the week as a holiday will not be welcomed by the pupils, as it is the only day when they can relax.
6. Barring a few, all night schools are proprietary. The owners tend to become business-minded and neglect the interests of the pupils. It is advisable, therefore, to form educational societies to conduct these schools. These societies would bring in with them security for teachers, more contact with society at large and co-operation. It is the policy of the Government educational department to encourage the formation of societies. This should be extended to the field of these night schools also.
7. Moreover, the great number of private and unrecognized English coaching classes spread all over the cities, especially in a city like Bombay, do more harm than good, as there is no check on their activities. All such classes should either be brought under the control of the Education Department or should be closed down in the wider interest of education.

In short, every attempt should be made to encourage the pupil to carry out the task he has undertaken. His enthusiasm must never fail on account of fatigue or for want of employment. In a free atmosphere of sympathy and love on the part of the teachers, who converse with their pupils as friends and teach them with trained precision, and with as many extra-curricular activities as possible—such as a reading room, a news-board, excursions, festivals, gatherings and visual education programmes—the pupil in a night school is bound to succeed.

J. G. PADHYE

DELINQUENCY AND ITS TREATMENT

As Many Causes as Individual Cases

DELINQUENTS are those who cannot adjust themselves in society. This is due to abnormalities in their character. Their behaviour as expressed in their speech and actions is so complex that they neither allow the people around them the peace and pleasure of life nor are they happy themselves. What is it then that forces them to behave as they do? The more closely concerned with such children people have been, the less inclined have they been to generalize or even to classify the 'behaviour patterns'. The Director of Borstal, R. Y. Bradlay, observes: 'I have been in this work for more than 23 years. And I do not know the causes yet. However many individuals may come into Borstal, there are that number of individual cases.' The delinquency problem, like the whole of the crime problem, is still in an exploratory stage. As Cyril Burt, the noted expert in the field, puts it: 'Many a wide variety of causes may contribute to youthful delinquency. In all, more than 170 distinct conditions have been encountered, every one often conclusive to childish misconduct. On an average each delinquent child is the product of nine or ten subversive circumstances, one as a rule predominating and all conspiring to draw him into crime.'

A child is to be regarded as technically delinquent when his anti-social tendencies appear so grave that he becomes, or ought to become, the object of official action.

The causes of delinquency can be classified under three main categories, namely, socio-economic, psychological and psychiatric. They can be further enumerated as overcrowding, poor housing conditions, socio-economic status of *per capita* income, bad neighbours, early cessation of education, absence of either or both the parents on account of death, desertion, separation or divorce. The attitude of a stepmother or stepfather, the feeling of being neglected, too much fondling by the parents or guardians on account of the child's being the only issue or being without parents, physical ailments, unhealthiness, lack of proper checks of public opinion and lack of understanding of the social responsibilities also lead to delinquency. However, there are examples of children having remained non-delinquent in spite of being brought up in circumstances such as the above, as there are instances of delinquents cropping up in the most highly cultured and educated families. These are psychological and psychiatric cases.

Cases of children turning delinquent on account of socio-economic reasons are understandable, but those coming under psychological and psychiatric categories deserve elucidation. Let me cite a case as an example.

I had a boy who was brought up by his sister along with her own son. Her husband had provided a car for him to go to school in. He

could have everything his sister's son had. The boy was very happy till the age of 12. He then started stealing money from his brother-in-law's pockets and allowed the blame to be put on the servants in the house. He kept the stolen property on the flushing tanks in the latrines. He pretended to be suffering from diarrhoea and went to the latrines frequently. Each time he went in, he counted the money and put it back on the tank. His sister gave him medicine to cure his illness. The boy permitted all this to be done. Unfortunately for him the mystery was unearthed by a servant who casually saw him from the building in front of the latrines. The boy was reprimanded and was asked to leave the house. He became an habitual absconder and gradually turned into a confirmed delinquent. He collected old tickets for through trains and by removing the last layer imprinted with the date replaced it by new dates, by substituting the layer removed from platform tickets: these tickets he sold at black-market rates. He was caught and committed to our certified school. Here he obtained some herbs and managed to make his throat red so as to make the doctor believe he was suffering from a serious infectious throat disease. He was then taken to a city hospital. He absconded from it and travelled to places as far away as Ahmedabad and Delhi. He was brought back to his sister by a man who appeared to be honest. The boy had become so weak and emaciated that his sister gave up hope of his surviving. He was admitted to a city hospital. I had the opportunity to interview him there for the first time. On interviewing his relatives and himself I learnt that the person who had brought him home was a rogue and was the cause of the boy's confirmed delinquency. He used to advance him money and clothing. He even stood bail for him and got him out of jail. The influence of this man had been so very great that the boy admitted to me that however sincere and honest our efforts might be, he was sure to drift towards him even after the discharge from the school. Unfortunately the boy was discharged from this school within a fortnight after his readmission and since then nothing has been heard of him either by his relatives or myself. The boy had told me during my interviews with him that he had detested home because, in spite of all his comforts, he hated the discipline of family life.

I have dilated at length on this case only because it shows clearly the depths of the human subconscious mind. Readers can well imagine how very difficult it is to diagnose every case. There can be nothing like generalization and one is often led to echo what Mr Bradlay has said. Each case is unique and deserves careful scrutiny. This also is an answer to the low percentage of successful cases at institutions like ours. The difficulties lie in faulty diagnosis; and even if a case is diagnosed we often fail in correct treatment.

The State of Bombay has a Juvenile Branch which has recently been transferred to the Education Department from the Home Department. All the children coming under the provisions of the Bombay Children's

Act, 1948, for the custody, protection, treatment and rehabilitation of children and youthful offenders are attended to by the Juvenile Branch. The Chief Inspector of Certified Schools, Bombay State, is the highest executive authority. He controls all the Remand Homes, Certified Schools, Protection Homes and Fit-person Institutions. There is a Bombay State Probation and After-care Association also, to follow up the released and the discharged pupils. The Chief Inspector of Certified Schools is usually the Secretary of this Association. The children are usually picked up by the police or the probation officers and brought to the Remand Homes, where they are detained for safety under remand. The Probation Officers make inquiries about home conditions and recommend to the Juvenile Court the release of the child on bond to the parents or his commitment to a certified school. The commitment depends upon the certified age. The child is usually committed to a certified school till he completes his eighteenth year. These Juvenile Courts differ from other courts. They are not required to interpret law. They consider the desirability of the child's commitment to a certified school or a Fit-person Institution, or his release on bond to the parents. After completion of two-thirds of the commitment period the case is usually reconsidered for the child to be released on licence. Those children who are thus released are supervised by the District Probation and After-care Associations. The Probation Officers supervising such children seek employment for them and bring about the adjustment of these children with the normal life of society by guidance and help to both the children and their relatives.

Education in a school for delinquents presents a special problem. The pupils have an apathy towards learning. They have a deep-seated hatred for school. They are greatly retarded from the point of view of scholastic standards. They associate most of their previous failures with their school experiences. Our aim, therefore, must be to help the individual according to his needs. His stay at such institutions is not for more than three years. He has to seek admission to some normal school for further studies after his release. Hence we cannot have a different curriculum in such schools. Every individual admitted will have to be taken at the level he is and not at what he should normally be. The considerations of normal standards of scholastic attainments no longer stand. It does not mean that these delinquent children lack intelligence or the ability to learn. They have these potentialities but they are diverted to wrong channels. Therefore it is desirable to place them in a grade which they can comfortably fit. Before the child goes to his class it is absolutely necessary that he is carefully observed by the Superintendent, the head of the technical and educational departments, the doctor and the teachers and the instructors to whose care he is going to be entrusted. Everyone should observe the child in his own way and join hands to plan a co-ordinated programme for his life at school. In the meantime he can be gradually introduced to the activities and routine of the school under the able guidance of

a responsible worker of the institution. This would remove all the wrong notions that might be in his mind about the certified school. He is like a patient who has been brought to a nursing home, and he has to be treated as such. The atmosphere around him should create in him a feeling of hope and love.

The child whose energies have been diverted to the wrong track has got to be brought back to the point from where he missed his way, and this is the most important and by far the most difficult job. If we once succeed in retracing his steps and show him the right way, I believe half the battle is won. This is, indeed, a trying time for the workers at the school. It requires patience and perseverance and implicit faith in the ultimate aim of the institution. Theory and practice in this respect, usually, appear to be very far away from each other. The child has to be kept engaged in some activity. The school should lay greater emphasis on recreational activities. Youth needs scope for normal emotional outlets. Vigorous physical activities in the form of physical training in the morning and games in the evening, inter-school tournaments and sports, scouting with all its outdoor activities, and visual instruction programmes, dramatics and hobbies should form the major items of the activities. These children can be taught to respect rules and develop an interest in activities that will help them to readjust themselves in social settings. There can be healthy competition in these activities and not in school classes. Scholastic education should be gradual and as far as possible at the pace at which the child is ready to accept it. The curriculum of the school should be broad-based. The child being a boarder of the school is an advantage. History, geography, civics and general science can be taught on the playground, in the auditorium, while attending to duties such as cleaning, washing and dining. Every worker in the institution has a part to play. Any one can help the child to be neat, clean and tidy. And the child should never be criticized in the classroom.

In addition to the teaching of the three R's, the curriculum should include music, drawing and crafts that will appeal to the aesthetic sense. To compensate for scholastic retardation vocational training needs to be given. It should be at least of the pre-apprentice level, for people cannot be skilled workers in any trade unless they have a certain standard of scholastic education.

However sympathetic and efficient the handling of the children at schools may be, they do not like to stay in institutions as committed children. So it is absolutely essential that they should be released either to their parents and relations or to the After-care Associations for employment in auxiliary workshops of their own choice, trained as apprentices, and gradually given freedom under the guidance and help of the supervising Probation Officers to readjust themselves to normal society.

S. V. JOSHIRAO

SUMMER SCHOOLS FOR TEACHERS

Solving the Teacher-Shortage Problem

ACCORDING to the report of the Central Advisory Board of Education, popularly known as the Sargent Report, it is estimated that for the proposed expansion scheme for the training of teachers it is intended to train 2,217,733 teachers in the course of 35 years for the pre-primary and junior basic (primary), for the senior basic (middle) and for the junior and senior departments of high schools. In the same report it is stated that the existing institutions are able to do no more than meet the wastage of the existing establishments and possibly provide training for the present teachers who are untrained. They admit that to provide the vast army of teachers which a national system will require, a large number of new training institutions will be needed. This report was submitted in 1944; but unfortunately the Government for several reasons has not been able to put the scheme into operation. While a few new training institutions have been opened in the various States, their number is not enough to train the required number of teachers.

One of the ways by which teachers can be trained with very little cost to the Government is through Summer Schools, which could be started in all the existing training institutions.

The United States of America, which has reached a high standard in educational progress and in which there are already a large number of teachers' training institutions, has realized the importance of increasing her teachers' efficiency and qualifications. This has been achieved by having Summer Schools in practically all the colleges and universities and in the training institutions. The Teachers' College, Columbia University (the largest teachers' training college in the world), in one year enrolled as many as 14,000 student teachers from forty-eight States during the summer. These students select the courses in which they are interested, pay for them and are given credits in them. After they have acquired the required number of credits, which may take from three to five or even six years, they are given their diplomas for the degree for which they have worked. The students attending the Summer School are not deputed by the schools or institutions in which they are working. They come on their own as they are keen to advance their professional work and keep themselves abreast of the times.

Sometimes eminent professors from other universities or colleges are invited to conduct courses in which they are specialists. In spite of having the best of educational institutions, the Americans are not quite satisfied with their system of education. They are the severest critics of their own system and are not ashamed to admit that there still remains a lot for them to achieve through education, especially in bringing about a better social order.

The majority of our school teachers, and even the teachers in most

of our training institutions, fail to keep themselves well posted on the latest developments in education. Very few of them read books or study the educational journals in their libraries. And as far as writing of articles on their own subjects is concerned, their contribution is practically nil. One's ability to write depends to a large extent on the amount of reading one does. Except during the periods of practice teaching, lecturers in training institutions have very little work; but very few of them make use of their time to full advantage.

There is still another thing that we have to learn from the American colleges and universities. Almost every member of the staff, whether in his own college or university or outside, gives about six weeks of his or her vacation for the Summer Schools. They have to prepare themselves for these courses and get the outlines of their lectures mimeographed and distributed among the students. They put a tremendous amount of work into these lectures.

If all our training institutions held such Summer Schools, in a few years the pupil-teachers would have got their diplomas or degrees. At the same time they will have utilized their vacations profitably and also got their training with very little cost to the Government. Such a scheme would prove especially beneficial to the untrained teacher. Advanced and refresher courses may be offered to those already trained. As for the staff, it would be better to have an exchange of lecturers among the training institutions conducting such courses. Such a scheme would give an opportunity to the lecturers to learn from other institutions things which might be introduced in their own schools. At present there is no means whereby people from one institution could go to others and thus come in contact with their fellow teachers and learn what they are doing. The greatest benefit the lecturers would derive from going to other institutions is meeting people of their own profession and making contacts with them. There *are* teachers who are genuinely interested in their work and who are eager to learn.

If all our training institutions held such Summer Schools with a credit system for pupil-teachers attending them, in a few years we shall have given training to a few thousand teachers, and refreshed those who are already trained by acquainting them with the lastest developments.

The expenses of travelling and of the honorarium paid to the lecturers may be met partly from fees and partly by the Government.

To put such a scheme into operation, it would be necessary to invite opinions from all the heads of training institutions, and from other educationists, and form a committee which would go into the details of the scheme. If the Government, private institutions and the general public were to co-operate, the Scheme would be sure of success, and would greatly help the Government in the gigantic task of training the army of teachers who are required to liquidate illiteracy and to teach our children through the best available methods.

PREM CHAND LAL

CORRESPONDENCE

MR V. D. VASANTGADKAR of the New High School, Nasik writes:

In response to the geometrical proposition given by Mr Kolekar of the Mudhoji High School, Phaltan, in the September 1949 issue of TEACHING (congruency of triangles, given two sides and the included angle-bisector equal), may I suggest the following as an alternative proof?

Data. In $\triangle s$ ABC, DEF,
$AB = DE$, $BC = EF$ and the angle-bisector BP = the angle-bisector EQ.

To prove $\triangle ABC \equiv \triangle DEF$.

Construction. Through P and Q draw parallels to AB and DE resp. to meet BC, EF in X and Y resp.:

Proof. $\because \angle XBP = \angle PBA$ ... ... (Data)
$= \angle BPX$ ... ... ($PX \,//\, AB$)
$\therefore BX = PX$.
Similarly, $EY = QY$.

Now, $\dfrac{CX}{XB} = \dfrac{CP}{PA}$ ... ... ($PX \,//\, AB$)

$= \dfrac{BC}{BA}$ ... ... (BP is bisector)

$= \dfrac{EF}{ED}$ ... ... (Data)

$= \dfrac{FQ}{QD}$ ... ... (EQ is bisector)

$= \dfrac{FY}{YE}$ ... ... ($QY \,//\, DE$)

$\therefore \dfrac{BX + XC}{BX} = \dfrac{EY + YF}{EY}$ ... ... (Componendo)

i.e. $\dfrac{BC}{BX} = \dfrac{EF}{EY}$. $\therefore BX = EY$ ... ... ($\because BC = EF$)

$\therefore PX = QY$ ... ... (Isos. $\wedge s$)

$\therefore \triangle BPX \equiv \triangle EQY$ ... ... (Three sides)

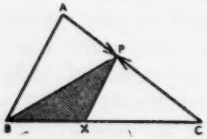
$\therefore \angle PBX = \angle QEY$.

$\therefore \angle ABC = \angle DEF$.

Now, in $\triangle s$ ABC, DEF

$\because AB = DE$, $BC = EF$ ... ... (Data)
and incl. $\angle ABC$ = incl. $\angle DEF$ ... ... (Proved)

$\therefore \triangle ABC \equiv DEF$.



The above proof suggests a method of constructing a triangle from these data.

Proposition. To construct $\triangle ABC$ given AB, BC and BP the bisector of $\angle B$.

Construction. Draw BC of given length and divide it at X so that $BX : XC = AB : BC$.

On BX, construct $\triangle BXP$ so that $BX = XP$ and BP = the given bisector.

Through B, draw $BA \,//\, XP$ meeting CP produced in A.

Then ABC is the required triangle.

The proof is fairly easy and is left to the reader.

BOOK REVIEWS

Our Growing Human Family. By MINOO MASANI. Illustrated By C. H. G. MOORHOUSE. 5½" × 8½". Pp. 116. Oxford University Press. 1950. Rs 5

Here is another book by the author and the artist who collaborated to give us that remarkable best-seller, *Our India.* The theme this time—the story of mankind—is a much wider one; there is, therefore, even more scope than before for instructive writing and imaginative drawing. The size of the book, of course, was a limiting factor, at least for Minoo Masani; for, in one hundred and sixteen pages, only the broadest of broad outlines of human history could be undertaken. The twelve chapters of this little volume, however, contain a wealth of information and make fascinating reading for the old as well as the young.

The story begins with the miracle of the beginning of life on this earth. But the history of several million years of evolution has to be compressed within a few pages, for the author is primarily concerned with Man and his 'clumsy but patient and persistent efforts . . . in the way of living with his neighbours'. In words and pictures, the growth of human social organisms is traced, from the primitive tribe of the past to the League of Nations and the United Nations Organization. In the end we are given a peep into the future when, if men are intelligent, the poet's dream about 'the Parliament of Man, the Federation of the World' may become a reality. But, as the author points out, the goal of human advance is not merely the setting up of a World Federation, but the provision for every human being of a freer, a fuller and a richer life.

Those who have read *Our India*—and who has not?—are familiar with the racy, conversational style of Minoo Masani and the striking drawings with which C. H. G. Moorhouse graphically illustrates the subject-matter. These features are once again conspicuous in the present book. Mr Masani knows how to catch the interest of the young reader in the first few sentences and how to hold that interest to the end of the chapter. The book abounds in felicitous quotations and interesting anecdotes which fit into the context and lend charm and vividness to the narrative. If there is any criticism, it is that here and there the idea expressed and the language of expression may perhaps be beyond the comprehension of adolescent minds. Though the book is supposed to be written for children of fourteen and fifteen the message that it conveys is meant for all. This volume is a 'must' for every school library.

* * * *

Nava Maga Readers, I-IV by H. D. SUGATHAPALAO 16mo. Book I, pp. 158, Rs.2; Book II, pp. 248, Rs. 3.50; Book III, pp. 292, Rs. 3.50; Book IV, pp. 164, Rs. 2.50. The Colombo Apothecaries Co., Ltd. 1948-50.

Nava Maga in Sinhalese means the same as *Naya Marga* in Hindi, and both mean in English the 'New Path'. Writers of textbooks in various Indian languages will have much to learn from the methodology behind these four books.

One need not know the Sinhalese language to appreciate the books. Each has been illustrated in three-colour, two-colour, and black-and-white illustrations. Handy and uniform in size, the books are a pleasure to handle. The margins are wide; the space between lines is requisite; and the sizes of types are varied to suit the age of the readers; lovely borders are used for poems; and the chapters have decorations at the top and as end-pieces.

The *Nava Maga Readers* have been prepared by a man who has been teaching children for the past twenty years. His wife also is a teacher in the same primary school, and between them, the concepts behind the *Nava Maga Readers* were formulated. In so far as the basic concepts are concerned they had practical experience to rely on. But the existing Sinhalese textbooks were carelessly printed and haphazardly designed. Didactic stories, and words unsuited for the children abounded in them. Classical texts were meaninglessly paraded and sectarian and pseudo-nationalist heresies exhibited.

Hence there was the need to clear a new path, and the authors decided to do this. They planned the first book to tell the child in an intimate manner

all about its day-to-day activities, the second book to describe the country and its peoples, the third book to acquaint the child with the world at large, and the fourth to introduce classical and modern literature.

Poetry, stories and passages descriptive of other countries had to be gathered. Poetry being universal, translations from other languages had to be made. Plays were necessary also. The child's innate talent to mime and act had to be developed. Besides, play-acting develops speech and memory. The stories had to be drawn from all periods of the world's treasuries.

The first reader, intended for Standard II, is made up of Jataka stories rewritten to suit the children, with more emphasis on the story element than on the religious content, and of descriptive pieces about day-to-day activities. 200 words only are used and repeated so that the children can get them fixed in their minds. These words are listed at the end of the book in the order of their appearance.

The second reader, for Standard III, describes Ceylon to Sinhalese, Tamil and Burgher children. Alongside the essay on Vesak, there are also pieces on Deepavali and Christmas, so that the children of one community can learn something about the other communities. If the Sinhalese New Year celebrations are described, so also are the Hindu New Year celebrations explained. These essays, chronologically placed, are interspersed with historical stories, folk-tales, sketches of economic activities in the island, and playlets. Paintings by well-known Ceylonese painters, including W. J. G. Beling, A. C. Collette, Manjusri, G. S. Fernando, and David Paynter, have been reproduced.

The third reader is more interesting. The world at large composed of many countries is revealed to the child as one world. Episodes from Tom Sawyer's and Baron Munchausen's adventures are side by side with two fables by James Thurber and a Chinese playlet. Among the thirteen poems in this reader are translations from Tagore's *Crescent Moon*. This reader is considerably brightened up by descriptive pieces about the lives of children in other countries, such as Arabia or Sweden. Stanley Kirinde, a schoolboy artist, has enlivened the pages of this book with his coloured and black-and-white illustrations.

The fourth reader, for Standard V, is intended to prepare the children for secondary school education. In order to develop a genuine love for literature, stories from the Jatakas and the Bible are given as well as adaptations from Charles Dickens and Leonard Woolf. Short stories by contemporary Sinhalese writers, Martin Wickremesinghe and G. B. Senanayake, have also been included. Extracts from the *Guttila Kavya* said to be the finest poem written in Sinhalese, find a place. Thus it will be apparent that a synthesis between the East and the West, and between the ancient and the modern has been attempted. The illustrations for this book, mostly done in the style of Sittara painters by Sybil De Silva, would distinguish this book in any book exhibition.

The authors have added notes as to how each lesson should be taught. It is to be hoped that they will issue a pamphlet on the methodology of these textbooks, as it should be of interest to teachers and others in India.

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